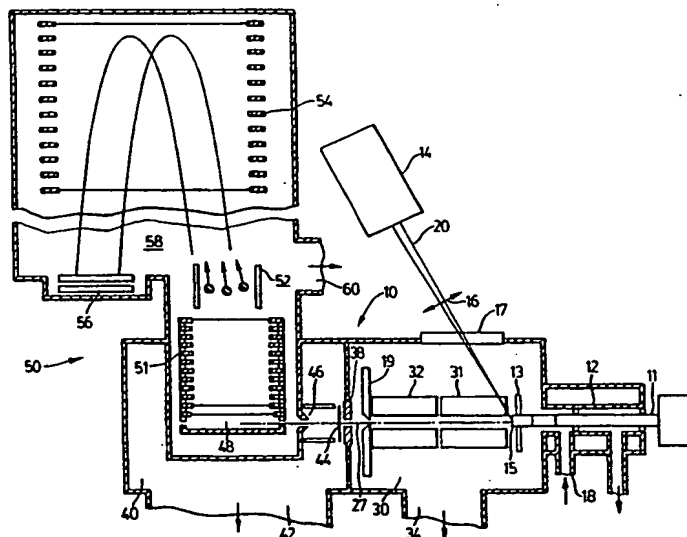




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(21) International Application Number: PCT/CA99/00034 (22) International Filing Date: 25 January 1999 (25.01.99) (30) Priority Data: 2,227,806 23 January 1998 (23.01.98) CA (71) Applicant (for all designated States except US): UNIVERSITY OF MANITOBA [CA/CA]; Winnipeg, Manitoba R3T 2N2 (CA). (72) Inventors; and (75) Inventors/Applicants (for US only): KRUTCHINSKY, Andrew, N. [CA/CA]; 36B-99 Roslyn Road, Winnipeg, Manitoba R3L 0G4 (CA). LOBODA, Alexandre, V. [CA/CA]; 230-140 Baylor Avenue, Winnipeg, Manitoba R3T 3P4 (CA). SPICER, Victor, L. [CA/CA]; 63 Point West Drive, Winnipeg, Manitoba R3T 5H1 (CA). ENS, Erich, W. [CA/CA]; 27 Warrendale, Winnipeg, Manitoba R2M 5B8 (CA). STANDING, Kenneth, G. [CA/CA]; 60 Kings Drive, Winnipeg, Manitoba R3T 3E5 (CA). (74) Agent: BERESKIN & PARR; 40th floor, 40 King Street West, Toronto, Ontario M5H 3Y2 (CA).		(81) Designated States: AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, US, UZ, VN, YU, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG). Published With international search report. Before the expiration of the time limit for amending the claims and to be republished in the event of the receipt of amendments. (88) Date of publication of the international search report: 21 October 1999 (21.10.99)	

(54) Title: SPECTROMETER PROVIDED WITH PULSED ION SOURCE AND TRANSMISSION DEVICE TO DAMP ION MOTION AND METHOD OF USE



(57) Abstract

A method and apparatus are provided for providing an ion transmission device or interface between an ion source and a spectrometer. The ion transmission device can include a multipole rod set and includes a damping gas, to damp spatial and energy spreads of ions generated by a pulsed ion source. The multipole rod set has the effect of guiding the ions along an ion path, so that they can be directed into the inlet of a mass spectrometer. The invention has particular application to MALDI (matrix-assisted laser desorption/ionization) ion sources, which produce a small supersonic jet of matrix molecules and ions, which is substantially non-directional, and can have ions travelling in all available directions from the source and having a wide range of energy spreads. The ion transmission device can have a number of effects, including: substantially spreading out the generated ions along an ion axis to generate a quasi-continuous beam; reducing the energy spread of ions emitted from the source; and at least partially suppressing unwanted fragmentation of analyte ions. Consequently, a number of pulses of ions can be delivered to the time-of-flight or other spectrometer, for each cycle of the ion generation.

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INTERNATIONAL SEARCH REPORT

International Application No

PCT/CA 99/00034

A. CLASSIFICATION OF SUBJECT MATTER

IPC 6 H01J49/42 H01J49/04 H01J49/40

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 6 H01J

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	DE 195 11 333 C (BRUKER FRANZEN ANALYTIK GMBH) 8 August 1996 (1996-08-08) column 5, last paragraph - column 7, paragraph 1	1,24
P,X	--- KRUTCHINSKY A N ET AL: "Collisional Damping Interface for an Electrospray Ionization Time-of-Flight Mass Spectrometer" JOURNAL OF THE AMERICAN SOCIETY FOR MASS SPECTROMETRY, vol. 9, no. 6, 1 June 1998 (1998-06-01), page 569-579 XP004122896 ISSN: 1044-0305 cited in the application the whole document --- -/--	1-43



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Patent family members are listed in annex.

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Date of the actual completion of the international search

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INTERNATIONAL SEARCH REPORT

International Application No
PCT/CA 99/00034

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
E	WO 99 30350 A (UNIV BRITISH COLUMBIA ; COLLINGS BRUCE A (CA); DOUGLAS DONALD J (CA) 17 June 1999 (1999-06-17) page 8 - page 9 -----	1,24
A	US 5 689 111 A (DRESCH THOMAS ET AL) 18 November 1997 (1997-11-18) page 5, line 28 - page 6 -----	1,24

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/CA 99/00034

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
DE 19511333 C	08-08-1996	GB 2299446 A,B US 5763878 A	02-10-1996 09-06-1998
WO 9930350 A	17-06-1999	NONE	
US 5689111 A	18-11-1997	AU 4059597 A EP 0917728 A WO 9807177 A WO 9807178 A	06-03-1998 26-05-1999 19-02-1998 19-02-1998

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